FROM SLIDES TO HOPS.

Glider Flying Instruction Manual

prepared for A.T.C.

and

Civilian Instructors and Pupils.

by

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Dedicated to the memory of

my brother Lawrence

and

Ronald Vincent. R.A.F.

whose enthusiasm did so

much to fostering the

gliding interest in Western Canada.

PREFACE.

"From Slides to Hops" was originally intended to be an instruction guide for use in the A.T.C. gliding schools for both instructor and cadet. This booklet is now presented in a slightly varied form to meet the post war gliding program, yet without detracting from its original setting or purpose. Presenting an instruction manual to the merest detail is made possible by my twenty-three years experience in Canada and England and recent position as Deputy Chief Gliding Instructor with the Air Training Corps.

The sequence of instruction in relation to student psychology has been carefully considered throughout this course to obviate general mistakes and errors that so often occur during training and instruction. No claim is made for the "invention" of new principles, for the methods presented are mostly well tried throughout the world, with the exception of a number of elaborated details, ~~xxxx~~ and originality of presentation.

Instructors who are not entirely sure or satisfied with their results may undoubtedly find their answers to personal problems and the student should find some enlightment to assist in his insatiable desire for knowledge in his quest to become a sailplane pilot.

If this little booklet serves towards this end, I will feel I have accomplished every justification in its presentation.

I wish to acknowledge and express my gratitude to Miss I. Morton for her encouraging assistance and typing of the manuscript.

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[redacted].

FROM SLIDES TO HOPS.

The instruction of pupils in the art of gliding is fascinating and requires special apptitude on the part of the instructor. He must understand and even feel the reactions of each separate pupil, judge correctly the reason for faulty controlling and have the wisdom of the wise Solomon. On single seaters, the pupil is always alone at the controls, and he is prompted during his training only by personal advice and teachings, since there is no one with him to correct errors or mistakes. It is extremely important, ~~as may be visualized~~ to understand, that systematic training is vital to gain efficiency and the successful conclusion to solo training. The highest standards and greatest care exercised by instructors must never slacken. Thoroughness to detail, checking errors, explaining and imparting confidences are all required of the instructor.

The following system is the result of the writer's many years of gliding experience, both in Canada and England, and as Deputy Chief Gliding Instructor (Air Training Corps), he put his long experience into adopting methods based on thoroughness, giving special attention to the psychology of the student. This course is divided into stages and the pupil learns gradually stage by stage. At the completion of the course, ~~the~~ THE pupil will have covered his lessons of practical flying in progressive stages, with the instruction never advancing beyond ~~the~~ HIS progress ~~of the student.~~ This practically eliminates forgetfulness due to excitement or over confidence, and permits the reactions of the pupil to be more closely observed, and early corrections and check-ups to be made during the training.

The Introduction.

1. Have the pupil take his seat in the glider and explain the need for securing the Sutton Harness comfortably, and snug. A second pupil will support the wing tip, holding the glider level.

2. Show the correct position for the feet on the rudder bar or pedals and the correct method of holding the stick. The left arm should be allowed to rest upon the cockpit side with the hand holding the edge. for support.

3. Explain the action of the controls and permit the pupil to move the rudder bar and stick. Students who have had link trainer experience or dual flying will quickly grasp your meaning.

4. Explain the method of the release for detaching the towing cable and allow some practice in operating the release, with a pupil pulling on the cable to lend weight against the ~~pull~~ PLUG.

5. When the controls are being taught the student will keep his eyes forward on the distant winch. The wings are not to be watched to see if they are dropping but the tipping movement will be felt through the pilot's seat and back. It is difficult at first for the pupil to tell the amount of heeling over with his eyes looking ahead but the movement becomes very apparent being felt through the body, that is, the seat and back. He will therefore learn to balance by "feel" and the senses of balance.

6. Course controling movements will be necessary during these early stages. Proceed to have the pupil move the ailerons and check any tendancy against rocking the stick backwards and forwards, as the stick is to move the ailerons only. Watch the elevators to see the student is not moving them up or down, more than a half inch or so at first. If extreme movement of the elevators is shown, have

the pupil continue to make sidewise movements until he has mastered the faulty tendency to rock the stick fore and aft. It will be advisable at this stage to thoroughly impress on the student, that by having the stick back, he will have the glider trimmed for taking off and the result would inevitably be a severe landing.

Wind Practice (Stage 1).

Before continuing with any instruction once the pupil is ready, have a second person support the wing, keeping it level. Then have the pupil neutralize his rudder, telling him to press left foot, or right foot, as required, and hold the stick forward at a designated position. This will be determined by the instructor and his check-up should see the elevators drooping to about 3 or 4 inches. During the instructor's remarks, the pupil is spending a few minutes feeling the controls in this position. The instructor can best explain all these points and check the pupil by standing 6 to 8 feet directly in front of the glider. By talking in a clear carrying voice he will at the same time permit all pupils who are grouped around the cockpit but clear of the outer section of the wings, where the flow of air will not be blanketed against the ailerons, to hear and absorb his remarks.

The day may be cold and the pupils standing about shivering, so the considerate instructor will be precise and explicit, clearly emphasizing his points without going into lengthy spectacular tales and stories of cross-country flying. These friendly "touches" may be talked over at another time, in a more comfortable atmosphere.

If a nice steady wind is blowing, have the pupil keep the glider balanced with the ailerons. Teach him to ease off the stick as the

wing approaches "level" position, thus preventing overcontrolling. His movements are to be smooth and precise, and all corrections instantaneous. Keep a close check on the elevators to guard against the tendency to rocking the stick backwards and forwards. Wind practice will be sufficient after three to five minutes instruction.

If there is insufficient wind, the instructor will hold a wing tip, dipping and raising it until the pupil counters with correct movements. Be sure to see that he begins to ease off the stick as the wings are nearing the level position and once level, his stick should be back at neutral.

The student will at this stage have absorbed the requirements for lateral control. It is only necessary for him to concentrate on wing balancing, that is learning how to maintain lateral control. His technique will not necessarily be perfect, but the following "ground slides" will better acquaint him with the required technique of controlling under more normal conditions.

Slides (Stage 2).

1. Position the stick for a droop of 3 to 4 inches on the elevators and see that the rudder is in the neutral position.

2. Have the pupil sit upright with his back resting comfortably in the harness.

3. Now permit his left hand and arm to rest on the cockpit side for comfort.

4. Ask him at this stage if he feels quite comfortable.

5. Explain that during his slides he will feel the tipping movement as the wings drop or raise through his "seat" and back. His sense of poise will tell him when the wings are level and his sight will verify

proper trim. A slight raising and lowering of a wing tip will be self-assuring to the pupil.

6. The winch is the pupils land mark and it is to be impressed upon him the necessity for keeping his vision directed on the winch and caution against watching a wing to see if it is in trim.

7. Rudder will not be used during first slides and feet are only to rest on the control.

8. Explain that during ground slide the only controlling required is that of maintaining good balance of the wings, and the winching will normally steady the glider directionally.

9. Instruct the student to move the stick sideways in long sweeping movements several times, and check whether he has a tendency to pull or push on the stick while doing these movements.

10. Just prior to giving the starting signals make certain the rudder is neutral, elevators are 3 to 4 inches down and cable is attached.

11. The instructor will call all starting signals checking the signaller and the acknowledgement at the winch to be certain that for the first ground slides the signals and acknowledgements are correctly given. He will watch the control movements on the control surfaces and check up on the results as the pupil and glider slide towards the winch. The slide need not necessarily be the full run of the aerodrome but timed to a minimum of thirty seconds.

12. The pupil will be instructed to remain in his seat, when the glider is being retrieved, and to hold the stick back during the return journey to prevent the cable fouling the elevators (This does not apply to the Hols. or Dagling), but particularly for the Cadet and Tutor which are now the standard trainers in the Air Training Corps.

13. Most students have little trouble in maintaining lateral control

but it will be noticed that quite often ~~that~~ the rudder is pressed on unintentionally. Remind the student to sit comfortably and to press evenly on the rudder control to prevent putting on rudder.

Rudder. (Stage 3).

1. After the eigth slide, the aileron controlling is normally satisfactory and the speed of the glider now may be slightly increased. At this stage the pupil will have learned the aileron technique and he is ready to learn further, so the following sequence of instructions will be in the familiarizing of rudder control. The rudder may now be used during slides and instruct the pupil to apply rudder gently to keep a straight course. Over-controlling will be apparent and the instructions should be carefully given to correct this tendency. The rudder is given at this stage to help check the pupil before he reaches the airborne stage and therefore eliminate future faults.

The instructor will follow all movements of the controls by watching from behind and check each slide if co-ordination of control is not apparent. Once the pupil has grasped the technique, it is most probable that during one of the slides, he had difficulty in getting a wing up, particularly if off his course.

Aileron and Rudder Co-Ordination.

This apparent lack of response to the controls not only mystifies the pupil but will also cause him to comment on his difficulty to maintain responsive lateral control. This trouble is largely due to the glider skidding sideways with the outside wing down and to properly trim the craft it is essential to use a little rudder with the ailerons, to check the skid. If the left wing is down, the pupil will apply right stick and right rudder. He must be discouraged from using

crossed controls and impress upon him the necessity for applying right stick and right rudder or left stick and left rudder. Four or five slides are usually sufficient to acquaint the pupil with the proper co-ordination and the instructor should make a note of any apparent weaknesses in control and check up on further slides until the pupil is doing his slides easily and with free and easy control movements.

Low Hops. (Stage 4).

In flight, the glider may be graceful and as beautiful on the wing as a gull, but in the hands of the novice flying for the first time, this beauty and grace may be succeeded by all the hair raising contortions of a wounded sparrow. Nevertheless, the student feels the first real sense of enjoyment on his first airborne hops, and his true enthusiasm overshadows all the awkwardness that may be his lot.

He will have flown no higher than three or four feet, yet this appears at first to be greater - some students may even remark they had gone up to fifteen or twenty feet. The student must bear this point in mind, for he is now to learn how to co-ordinate this height sense and the perspective of objects viewed from above. The functioning of these senses will enable him to maintain perfect poise in the air, to glide and land correctly. One has only to travel in the upper deck of a bus or look around his surroundings from the third or fourth rung of a ladder to realise how much the perspective changes with only a little additional height.

The student, making his first two or three preliminary hops, will actually be under the control of the winch driver. This means that the student will have hold of the stick, and his feet

will be on the rudder bar, but his movements will be limited to aileron control. The instructor will show him where to keep his stick, so that the elevators will remain in that position during the hop. The winch driver will then tow the glider off the ground, keep it airborne a moment, then let the glider gently sink back by slowly closing the throttle.

These preliminaries permit the student to become familiar with the airborne sense without having to be taxed with added difficulties. It is an excellent tonic to instal confidence, for the student thereby learns to trust his glider and he will find that a little movement forwards or backwards on the stick will alter the path of the glide. He will learn this measure by the fact that the ground comes up more quickly if the stick is gently pushed forward, or the nose of the glider turns away from the ground if the stick is pulled back. These facts will gradually take shape in the mind of the student and the movements on the rudder, ailerons and elevator are all learned co-operatively from this stage. It will take many many hours before the student has the experience to perform any manoevre instinctively. The instructor must bear this point in mind, and always remember that his students although making good progress will have gained only about twelve minutes experience when performing their first hops. It is only at this stage that all the controls come into use and the students difficulties must not be added upon by having to perform in a cross wind or rough and gusty air. If the wind has changed slightly it is not a lot of trouble to move the glider into a new starting position. Attempting to save a few minutes may be responsible for the glider going into a bad drift and the landing could be of sufficient impact to place the glider under repair for a week or more.

Intelligent instruction and forethought minimizes shop repairs, takes a little longer to perform, but over a period will certainly reward with gratifying results.

The first preliminary hops controlled entirely by the winch, should not exceed three or four feet in height. The writer has given them the name, of "Confidence Hops", and so they are. They give exhiliarating confidence to the student and certainly add to the confidence of the instructor in his pupil.

While never forgetting for a moment that the students total experience is only about twelve minutes, teach him gradually to hold his nose down in the glide and to level off just prior to touching down. The winch will gradually permit the student to glide down from three, four or five feet without assistance and permit him to level off and land. This liberty should only taper off gradually, so that the student can learn to judge the correct glide and the right time when to level off for the landing.

On each hop the instructor will carefully position the stick for a natural and easy take off. On some gliders a slight droop to the elevators will prevent the glider becoming "unstuck" too quickly, yet permits a nice gentle take off and returns the glider to the ground in a shallow glide.

If the instructor has any doubts just where the correct position is he should himself make a test hop to assure himself. He must of course consider the difference in the weights of the students, for a heavy pilot will give the glider nose heaviness and a light pilot will not have sufficient weight to get the nose down without assistance from the elevators.

All instructions should be given without hesitation and they

should also be straight to the point. Tell the student the movements he is to make and what you want him to do. This is a more precise method than mentioning a lot of "don'ts", for otherwise it leaves some doubt in the mind of the pupil as to what is actually required of him.

A good method of illustrating and obtaining a mental picture is to demonstrate the path of the glider using the hand to show the movement and position of the glider in the air.

By using your hand as a model to demonstrate, describe a movement showing a gentle climb to about shoulder height. The pupil will now push on the stick to start his descent. He must hold if a few moments in the forward position to allow time enough for the glider to describe an arc, going from the climb into a glide. Move your hand through the air demonstrating the path of the glider. Now explain to the pupil that he is gliding steeply and when he can see the ground rushing up towards him, he must gently start easing the control backwards. This will prevent him diving too steeply and begin to level the glider out for his landing. Now show him with your hand, by describing a sudden climb that he has pulled too much. He will now push on the control to return to the glide. He will gently begin to ease back on the stick as he nears the ground, feeling the glider on the stick. As the ground continues to rush past, he will gently jockey the stick backwards or forwards to hold the glider just off the ground. Motioning with your hand, you can show him his theoretical flight, and as the glider loses speed it gently sinks and lands lightly on its skid.

Now go through the motions again with your hand, and this time check the pupil's controlling as he follows the movements during

the illustratedflight. Make certain he pushes if you motion, "nose up" or if stalling recovers by pushing. To emerge from the climb to the glide make the pupil push steadily on the stick and teach him to hold it a moment before easing back to neutral. Drive home the necessity for "gentle pulls" and "steady pushes". If he can rise to this emergency you have put forward your points well and his landing will undoubtedly result in a good effort.

It is imperative however, during the landings that once the glider is a foot or two off the ground to immediately close the throttle and switch off, to prevent jerking the glider back into the air. This is easily done, since the winch running without a load on the drum may accelerate and catch up on the glider.

It is unfair either to the pupil or to the instructor to expect really good landings early in training. Some of the pupils may have a little difficulty in grasping the technique at first but by persevering and studying his errors, the instructor can soon eliminate these troubles.

Let us consider the pupil who has just landed after one of his first hops. He was told he had reached a height of about three feet and, will again go up to the same height, push forward on the stick steadily, hold it a moment until the glider has time to nose down into the glide, then ease back gently to maintain the glide and prevent too steep an angle of descent. This is the point where his previous glide went wrong. His stick came back too far, and the nose gradually got higher and higher, and as he neared the ground, he pulled back to level out as he was instructed. The glider already in the stall position, dropped the tail suddenly and bumped down on the rear of the skid. There was no harm done, but the wings flexed

noticeably and the sound of the landing could be easily heard downwind. From your position in front of the glider demonstrate how the glider will continue to stall if the stick is constantly kept too far back, and that the stick must be eased forward to regain speed. "Without flying speed a glide cannot be maintained", is a warning that cannot be stressed too often.

It is well to bear in mind that an ideal launch will not be one with too long a ground run which incidentally disheartens the pupil. Too sudden an acceleration causing the glider to bound into the air prevents the pupil having sufficient time to collect his senses and his mind becomes confused with too rapid a turn of events. The ideal launch with smooth acceleration and a gentle climb gives the pupil sufficient time to "feel" and "see" what is happening and his re-actions are usually more normal. Normally a run of approximately thirty feet before becoming airborne is ideal.

It is a simple matter to trim the glider to land by virtue of the stick setting but a "ropey" launch or a gusty wind will invariably upset all calculations, and the winch driver will have no controlover maintaining a steady climb or easing the glider down. A sudden gust will easily send the glider kiting up 20 to 50 feet in a rush, leaving the pupil fully unprepared for such an emergency.

Too many instructors fail to stress enough importance on the good approach prior to landing. A good approach permits the ideal for landing and naturally simplifies the process considerably. The pupil who has to recover first from a steep glide with excessive speed in hand, or nose down due to a threatening stall and has begun to lose the feel of his controls is hazzarded from the beginning in landing properly. Do not rebuke him for his landing. Get to the root of his trouble, namely, the approach and straighten out his

difficulty. Once you have him entering the glide properly, and maintaining it with a good smooth levelling off near the deck, you will get a good landing.

To assist the pilot in obtaining the correct "feel" of his glide have an assistant lift the tail of the glider to the required gliding angle you require. Holding this position a moment or two with the pilot looking forward is a method helpful in permitting him the "feel" and the proper angle he is to trim for his glide.

On the first flights the glider must not be kept on tow with the intentions of prolonging the flight. Since the pupil has been instructed to climb to under five feet, then push to enter the glide, he will otherwise perform a series of porpoising landings, bouncing sharply if the winch endeavours to keep the glider on tow. This must be strictly avoided for much of the damage in training occurs at this stage if winching and instruction is at fault.

When the pilot has made about six of these hops correctly he is ready for a free flight. At this stage the instructor will have impressed on the pupil the need for speed to maintain flight. Make him stall conscious, and if a pupil does a stalled landing make the most of the event by explaining the case as an example to the others in the class.

Free Flight (Stage 5).

The air must be free from sudden gusts and a gentle breeze will give ideal conditions for the first free flight, in which the pupil releases from the cable. This first release must be done at about 10 to 15 feet in height, and this height is sufficient to permit them to get the "feel" of free flight, without undue risk.

Once more set the control stick, neutral this time, and check

the rudder until neutral. The writer has found it a good practice to stand in front of the glider prior to the flight, describing the flight path with the hand. Describe the angle of climb by using the hand as a model. Now tell the pupil he is about 10 to 15 feet high and have him push on the stick to bring him back to level flight. As he begins to hold the glider level (verify this by watching his elevators) allow your hand to stop climbing and move horizontally for about 3 or 4 seconds. Then tell him to enter the glide and as he pushes forward on the stick describe the glide with your hand and tell him he is now gliding too steep, now too flat and see that his elevators are describing the proper amount and correct direction

of movement. As he nears the ground, he will begin to ease back so as to be flying parallel with the ground one to two feet high. Explain he has come in with a little extra speed and that he has pulled too much and is now in another climb. Pass your hand through the air in a climbing movement and see that the pilot eases forward on the stick to check the climb. His responses to this theoretical flight gives him an understanding of really what is required to conduct a good flight and the results will be extremely encouraging. The pupil finally holds the glider about a foot or two off the ground, loses speed and gently settles to a smooth landing. Have him repeat this theoretical flight going through all the movements again and explaining in his own words the progress of his flight. It is essential that the instructor has the pilot pushing sufficiently on the stick to enter his glide, during these theoretical flights. The Pupil's tendency is not to push quite enough and this can be overcome by drilling into him the correct amount of stick required before he goes aloft.

There is an advantage in safe keeping with systematic training, to have the student level off at the top of his climb before nosing down into the glide. During the climb, particularly when the climb is steep, the pilot can feel himself tilted well back. To be tilted forward suddenly from a sharp climb to a steep glide is a "sensation" and it is good training policy to prevent these startling sensations, particularly during the early stages of training.

Skidding in a car at high speed around a turn can so startle or unnerve the driver that momentary control may be lost. It is

instances of such nature as this illustration, that no ab initio should be subjected. All his senses must be alert and function properly without having to first recover from surprise or "sensation". Therefore, levelling off at the top of the climb for a moment will help him to adjust his sense of poise before the machine noses down into the glide.

The student who has command of this happy situation and who has been instructed to nose down to maintain flying speed, pushes forward on the stick. He may glide too steeply, but he certainly will begin his decent gliding and not stalling.

The student, nearing the top of his climb suddenly pushes the stick forward to enter his glide, may, and he often does, just push forward sufficiently, to level off. The result, if the glider's attitude remains the same, will be a pancake landing or the sloppy controls owing to loss of speed may cause the glider to drop a wing and go down out of control.

It is not necessary to practice levelling off during the very first low hops owing to the fact that the arc of the flight is shallow and the three or four seconds "flying time" gives little margin for bringing this instruction into practice.

Now for the real test. The glider climbs easily and the pilot curbs his ascent at about 20 feet. He is doing well. He flies level for a few seconds, noses down, then releases his cable. The glide appears good but the pupil now has difficulty.

The nose of the glider begins to rise and it turns off course as if drawn by a magnet. The nose drops again and with only a few inches to spare swoops up to three or four feet and begins to gently settle towards the ground. The starboard wing is low and it appears

at first the pupil is going to favour the instructor with a Chinese 3-point landing (wing tip, skid and tail). The glider lands on the back of the skid and the wings flex downwards with the impact, the glider having turned almost at right angles to the winch.

Now let us analyse the causes with a view to remedying a second occurence. As the glider began to climb on the take-off, the pupil watched the hedge behind the winch drop away and then change into new perspective. He was used to this phase of training but when he judged about ten or fifteen feet high, he gently pushed on the stick and saw the hedge appear directly in line with the nose of his glider. His instructor he remembered had said, "Ease off the climb, fly level and hold the glider steady 3 or 4 seconds, before pushing to enter the glide. When the nose is down - PULL".

The pilot pulled his release. He pulled hard, slightly throwing himself off balance, not much, but sufficiently to press his right foot on the rudder bar. His tensed body caused him to pull on the stick a moment after he released. He had hold of the release ring or "plug" before taking off, but he instinctively looked down at the release ring as he pulled. His mind became slightly confused with the turn of events; the ground seemed to have hidden itself underneath the nose of the glider, and later the ground, and objects ahead appeared strange. He remembered to put the stick forward to get his nose down but that was as far as his mind appeared to function. He did not realise, his foot was pressing the rudder bar nor his starboard wing was dropping more and more as the wind got under his port wing. The ground was rushing up quickly, and with but one thought to level off, he pulled on the

stick. The pull was over done; he climbed gently, stalled before he realised he had overcontrolled and his next conception was a ~~slight~~ sidewise jarring as he shifted in his seat on landing.

The retrieving car arrived and the crew turned his glider about and ~~he~~ he was soon on his way back to the starting position where the instructor awaited him. When he was once more turned into wind at the start, his instructor walked up, and stood before him and reassuring him with an analysis of his effort, explained what mistakes were the cause for his poor showing. The pupil may have shown some little surprise and not fully agreed to the instructor's deductions. He gave his own version, and this presented an opportunity for the instructor to drive home his points and break through any misconceptions that may have been troubling the pupil. To further illustrate the requirements of good releasing, the instructor attached the cable and while two persons pulled lustily on the cable, the pupil practiced pulling the "plug", while going through the movements on an imaginary flight. He looked straight ahead this time, pulled evenly on the "plug" and corrected an imaginary turn by applying a little rudder. He could see the ground approaching and gently eased back on the stick, visualising himself floating a foot or two off the ground, straightening up his wings, then waiting for the jar. There was no jarring, just a little bump, then smoothness, as the glider ricochetted off a slight unevenness on the ground. His landing was pleasantly smooth and he felt an immeasureable sense of satisfaction and pride in theorizing his flight.

The next flight began well, a steady smooth climb, rounding off evenly at the top, but the pupil with intentions of rectifying previous errors, unconsciously added another by pulling his release before nosing down. The instructor below saw the error but gave the pilot credit for nosing down immediately, afterwards. He trimmed his elevators for a nice glide and was a bit self-conscious regarding overpulling the stick before landing. The glider levelled off too high, but he kept parallel to the ground this time although the glider settled as it lost flying speed, and bumped a bit harder than he had pictured in his imaginary flight with the instructor. The instructor now cautioned him to judge his levelling off a bit lower, and try to observe the appearance of the ground, from the levelling off position, making a mental note of this perspective. This flight had been a bit higher, the pilot going to about thirty feet. The instructor cautioned him to keep a bit lower and not take on quite as much height for the next flight.

The pupil made three or four more flights and successfully grasped the technique of levelling off at the top of his climb, holding it a moment, then pushing into his glide and pulling the release. His glide now showed good judgement, and his rudder corrections exacting while the levelling out to land was gentle and effortless with a smooth touch down. The instructor will now exercise extreme care, bearing in mind the wind velocity. During windless days it is advisable for him to have the pupil make his first flight a low one. If there was ample distance for landing he may then be permitted to go a bit higher until the instructor is having him flying at a height terminating with a safe landing distance from the winch. It is a grievous error on the instructor's

part to tell the pupil to go up to say 100 feet or 150 feet on his first flight of the day. The pupil is not always a good judge of height with his limited experience and the glider may rise higher than is in safe keeping for a landing within the boundary of the field. Have him step up his flights, telling him each time just how high he was so that his perspective sense receives training to judging height.

A pupil who has only trained during windless days must be specially cautioned for using rudder to maintain directional control on his first flights in a breeze. Keep him low until assured his rudder corrections are good but for safety sake, do not permit exceptionally high flights when the wind is strong or at all gusty. If the gustiness becomes excessive it is better to postpone further hops, and ground slides could be resorted to, particularly for the pupils who may not yet have reached the hopping stage, or discontinue the training altogether.

If, owing to repairs or the necessity for continuing instruction with a glider of which the pupils are unfamiliar, explain to them the differences they will find compared to the machine they have been previously training on. Pilots changing over from the Hols to a Tutor or Cadet Trainer, for example will find the new machine makes more noise and rumbles as the tail skid bumps and jars across the 'drome. The Cadet or Tutor hasn't the gentleness and smoothness like the Hols on slides and is not so good in taking the bumps. The Tutor and Cadet have rudder pedals and the action is by pressing the toes of one foot while easing off with the toes of the other foot. Have the pupilpractice this movement a few times to familiarize him with the difference in action of the Hols rudder bar. Regardless of his good show during Free Flight, have him make a ground slide on the

strange glider and then hop him low until he becomes quite familiar to sitting lower to the ground and deeper inside the cockpit and more used to the controlability.

An interesting feature and one important in the art of instructing is the ability of the instructor to interpret and understand the varied types of students with their differences and distinctions of character. Some students react similarly but the ability to classify or group the types is rarely found amongst instructors.

Students, like everyone, have various traits. They are either quick to learn or grasp the meaning of things slowly, and some are panicky and others apparently have no show of nerves. There are those who are inoffensive and mild in nature, others who are rowdy, athletic, studious or have some ailment, and we do come across students with a streak of cussedness and self opinioned awkwardness.

A student should be judged by his willingness and ability and he may be placed or grouped into one of three distinctive groups.

Group 1.

Those who respond quickly and without effort to instructions.

Group 2.

Those who have some difficulty in learning quickly and lack rapid perception.

Group 3.

These are the difficult types and present a most serious problem to the instructor.

In group one, we have the ideal student. He is one who goes

through his instructions making good ground slides, good hops and glides and lands with the ease of one already experienced.

Those in group two, require more personal instruction and although they often do well, they are not able to absorb instructions with the self-same ease and grace of the first group.

Group three may be classed as the types who are pig-headed and regardless of instructions try to do things in their own way. Once allowed to get the best of the instructor they become an absolute menace. Fortunately, this type is few and far between, but when he exists, it is the instructor who must show mastery. His dealings with this awkward type must be rigidly stern. It may be necessary to show him up before his associates, illustrating the errors that are entirely his own doing.

This type is usually quick witted, reasonably popular but very self-willed. An instructor who is not fully conversant with instruction proceedure, may find his own errors thrown back at him, no matter how slight they may be. Confidence and good results may be only had by giving him much personal practical training, advancing him rather than witholding him when he becomes proficient. The real difficulty is holding his interest. Do it and you will dispell the stormy thoughts racing through his mind, and that will pave the way to approaching him on a more secure basis.

Let him run rampant in his own manner and the bills for repaired skids or more serious damages will be your own signal of failure.

The job of the instructor is almost a thankless one, but the sailplane ~~pilot who can~~ STUDENT WHO LATER rideshis wings on the wind and pilotshis graceful sailplane in faultless and picturesque flight, may have been one of ~~his~~ YOUR own students. A thankless job - well, maybe.

S U M M A R Y.

INTRODUCTION.

1. Sutton Harness adjustment.
2. Holding of controls correctly.
3. Practice in releasing tow cable.
4. Keep eyes forward - Control by feel.
5. Course aileron control at first without moving stick backwards or forwards.
6. ~~Second cadet~~ HELPER to support wing tip between instructions.

Stage 1. (Wind Balance).

1. Rudder neutral - stick slightly forward.
2. ~~Cadets~~ PUPILS to gather around cockpit but keep clear of ailerons.
3. Instructor to stand 6 to 8 feet in advance of glider when instructing.
4. Maintain balance in wind with ailerons.
5. Movements to be smooth and precise.
6. Stick must not creep fore or aft.
7. If there is no wind, instructor to "Waggle" wings correcting ~~cadets'~~ STUDENTS' movements.
8. ~~Second cadet~~ HELPER to be stationed at a wing tip.

Stage 2. (Slides).

1. Rudder neutral - elevators 3" to 4" droop.
2. Sit upright with shoulders comfortable in harness.
3. Left arm on cockpit side.
4. Feel tipping of wings through "seat".
5. Eyes forward on winch.
6. Rudder not to be used.
7. Concentrate on aileron control only.

Stage 2. (Slides contd).

8. Check movements on stick for "creeping".

9. Prior to slide instructor to see that:-

   (a) Rudder is neutral.
   (b) Elevators are 3" to 4" down.
   (c) Cable is attached.

10. Instructor to call all starting signals.

11. Minimum slide 30 seconds.

12. STUDENT Cadet to remain in seat during retrieving.

13. Minimum of 14 slides.

Stage 3. (Rudder)

1. After eighth slide teach rudder.

2. Aileron & rudder co-ordination.

Stage 4. (Low Hops).

1. Minimum of six hops.

2. First hop 3 to 4 feet high.

3. Succeeding hops to be controlled to under 10 to 15 feet.

4. Teach height sense.

5. Always winch directly into wind.

6. Rudder neutral - elevators slightly low before hopping.

7. Stick not to be pulled to "take off".

8. Illustrate with model or by the hand, flight required and movements on controls required.

9. Movements on controls to be "STEADY".

10. Winch DRIVER to check stall or keep glider into wind by "reeling" in cable.

11. Good approach and glide important.

12. "Towing" to cease when height of hop is reached.

13. Impress need for flying speed and the dangers of stalling.

Stage 5. (Free Flight).

1. First release not to exceed from 10 to 15 feet high.
2. ~~Cadet~~ PUPIL to go through movements on an imaginary flight to show controls thoroughly understood.
3. Rudder neutral - elevators slightly low.
4. ~~Cadet~~ PUPIL must not pull to "take off".
5. Movements on controls to be "STEADY".
6. Have ~~cadet~~ STUDENT fly level after his climb for a few seconds prior to nosing down and releasing.
7. Level off approximately two feet above ground when landing holding machine off by jockeying the stick.
8. Teach height sense.
9. First glide of day to be low then gradually stepped up until safe distance still remains for landing, thus preventing overshooting.
10. Rudder essential for control during windy days.
11. Explain unfamiliar characteristics of a new machine.
12. Explain the reason for grouping students into three catagories.